Personality and the Etiology and Expression of PTSD: A Three-Factor Model Perspective

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This review provides an overview of research on the influence of personality on the development, course, and behavioral expression of posttraumatic stress disorder (PTSD). The existing literature is discussed in relation to three broad-band personality traits that have been emphasized in personality and psychopathology research: negative emotionality (NEM), positive emotionality (PEM), and constraint/inhibition (CON). The primary conclusion derived from this review is that high NEM is the primary personality risk factor for the development of PTSD whereas low CON and low PEM serve as moderating factors that influence the form and expression of the disorder through their interaction with NEM. From this standpoint, a premorbid personality characterized by high NEM combined with low PEM is thought to predispose the trauma-exposed individual towards an *internalizing* form of posttraumatic response characterized by marked social avoidance, anxiety, and depression. On the other hand, high NEM combined with low CON is hypothesized to predict an *externalizing* form of posttraumatic reaction characterized by marked impulsivity, aggression, and a propensity towards antisociality and substance abuse.

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Posttraumatic stress disorder (PTSD) is a syndrome defined by a constellation of 17 characteristic symptoms that develop following exposure to a psychologically traumatic event (American Psychiatric Association [APA], 1994). By virtue of the fact that it is the only major psychiatric syndrome for which there is a specified precipitant, it seems particularly well suited for evaluating diathesis-stress models of mental illness and examining the interface between personality and psychopathology. Research on the influence of personality on the development of PTSD can potentially advance our understanding of one of the field's most perplexing questions—why some individuals exposed to trauma develop the disorder, while others do not. It may also contribute to our understanding of factors that determine the course, behavioral expression, and patterns of comorbidity associated with the disorder.

Recent advances in the study of personality have stimulated unprecedented interest in the interface between personality and psychopathology. These developments have included behavioral genetics and longitudinal developmental studies supporting the heritability and stability of trait dispositions assessed by personality inventories, as well as progress in the conceptualization and measurement of personality and temperament including its links to affective dispositions and structural and biochemical systems in the brain. This has prompted increased interest in the relations between personality and psychopathology within various disciplines (e.g., clinical psychology, psychopathology, social psychology, behavioral genetics, personality psychology) and has been reflected in funding initiatives from the

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National Institutes on Mental Health and special issues in major psychology journals devoted to the topic (e.g., *Abnormal Psychology, Journal of Personality*).

The field of traumatic stress and PTSD, however, has tended to lag behind this trend—one indication of which is that no comprehensive review of the literature on the relationship between personality and PTSD has been published in a peer-reviewed journal to date. Paris (2000) surveyed the literature on a broad array of factors that may predispose an individual to the development of PTSD, including premorbid personality, but did not focus extensively on the relevant personality studies. Chapters providing excellent summaries of this literature have been published in edited books (Schnurr & Vielhauer, 1999; Williams, 1999), but neither of these contributions organized the existing literature within a conceptual framework designed to provide coherence to the existing findings and a model to guide future research.

One possible explanation for the relative lack of attention to the relation between personality and PTSD lies in certain historical/political forces that have shaped the evolution of the field of traumatic stress. Prior to the 1980 appearance of the PTSD diagnosis in the *DSM-III* (APA, 1980), prolonged adverse responses to traumatic stressors were often conceptualized as reflecting premorbid personality vulnerabilities (e.g., Hall & Mackay, 1934; Saul, 1945; Lidz, 1946; Moses, 1978; Wegrocki, 1963; Fetterman, 1928). This perspective was controverted by the *DSM-III* definition of PTSD which emphasized the extraordinary nature of traumatic events, defined them as "beyond the realm of normal human experience" and minimized the importance of individual differences as indicated by the statement "the stressor producing this syndrome would evoke significant symptoms of distress in most people" (APA, 1980; p. 236). Along the same lines, some argued that under extreme conditions the impact of trauma will overwhelm individual differences in vulnerabilities to stress and PTSD will occur regardless of pretrauma personality risk and/or resilience factors (e.g., Hocking, 1970).

As Yehuda and McFarlane (1995) pointed out, implicit in this viewpoint was the assumption that the traumatic event is the major causal agent in the etiology of PTSD and that posttraumatic symptomatology reflects a natural process of adaptation to extraordinary adverse circumstances, i.e., as stated by Herman (1992; p. 158), "the normal human response to extreme conditions." Yehuda (1999; p. xiii) also noted that this point of view may have been embraced by some in the field because "it would spare victims the indignity of being misunderstood as 'neurotic' or constitutionally weak for succumbing to the effects of traumatic event". However, despite the clinical appeal of this position, the assumption that trauma exposure is the primary etiological factor in PTSD has been contradicted by accumulating empirical evidence.

Epidemiological studies have found that 40–90% of the general population experience a traumatic event meeting the PTSD stressor criterion in the *DSM-IV* (APA, 1994) at some point during their lifetime (Breslau, Davis, Andreski, & Peterson, 1991; Breslau et al., 1998; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Norris, 1992), yet less than 10% develop the disorder (Breslau et al., 1991; Breslau et al., 1998; Davidson, Hughes, Blazer, & George, 1991; Helzer, Robins, & McEvoy, 1987; Kessler, et al., 1995). The probability of developing PTSD following trauma exposure is estimated to be approximately 10% in the general population (Breslau et al., 1998), although higher rates (i.e., closer to 25%) have been observed for traumas involving violence or life threat (Breslau et al., 1991; Breslau et al., 1998; Schlenger et al., 1992; Weiss et al., 1992). Even the most devastating trauma, such as that experienced by rape survivors, prisoners of war, and holocaust survivors, has seldom led to more than two-thirds of the affected population developing PTSD (Green, 1982; Kluznic, Speed, Van Valkenburg, & Magraw, 1986). These findings demonstrate that trauma exposure alone is not sufficient to explain the etiology of PTSD, which implies that other factors—including, as this review will show, individual differences in premorbid personality—play important roles in moderating the relationship between trauma exposure and PTSD.

AIMS AND SCOPE OF THE REVIEW

The primary objectives of this paper are, first, to review the existing body of published research on the influence of personality on the development, course, and expression of PTSD and, second, to introduce a model for the interface of personality and PTSD that aims to account

for the influence of premorbid personality characteristics on the form and expression of posttraumatic psychopathology. For reasons that will be elaborated upon below, the focus of the review will be on the relationship between PTSD and three broad-band personality dimensions. The primary criteria for including a study in this review were (a) that it included an established measure of PTSD, and (b) that it included a measure of a personality that is conceptually or empirically related to a dimensional model of personality. Research that examined the relationship of *antisociality* and *hardiness* to PTSD were also included because of the large number of studies implicating these constructs in the development of the disorder and because there is a solid theoretical and empirical basis for conceptualizing them from a dimensional perspective. Studies that focused primarily on the utility of inventories such as the Minnesota Multiphasic Personality Inventory (MMPI) or Millon Clinical Multiaxial Inventory (MCMI) for the diagnosis of PTSD have been reviewed elsewhere (e.g., Lyons & Wheeler-Cox, 1999; Wise, 1996) and were only included if they specifically addressed the influence of personality on the development, course, or expression of PTSD. The studies reviewed in this paper were identified through a search of PsychINFO and PUBMED databases spanning the years 1980 (the date of the appearance of PTSD in the *DSM-III*) to 2002 using the keywords "*personality and posttraumatic stress disorder*" or "*personality and PTSD*" and through examination of the citations contained in the papers identified through this search. The search did not access unpublished studies or include published abstracts.

THE THREE-FACTOR MODEL OF PERSONALITY AND ITS RELATION TO PSYCHOPATHOLOGY

The literature on personality and PTSD, like the broader trait personality literature, is complicated by a lack of consensus regarding the basic dimensions of personality and their interrelationships. Personality traits are traditionally conceptualized as "dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings, and actions" (McCrae & Costa, 1990; p. 23), but personality models differ widely with regard to the factor structure, number, and definition of specific traits. As a result, the personality and PTSD literature is comprised of a collection of studies using disparate personality constructs and measures. Thus, to provide an overarching structure to this body of work, this review will focus on three broad-band dimensions that have consistently appeared in the literature on personality and psychopathology: positive emotionality/extraversion (PEM), negative emotionality/neuroticism (NEM), and constraint/inhibition (CON).

Drawing from Tellegen's (1985; in press) conceptualization of these dimensions, *PEM* will be used throughout the paper to refer to individual differences in the capacity to experience positive emotions and tendencies towards active involvement in the social and work environments. PEM has been linked conceptually to the neurobiological system underlying appetitive-approach behavior (Gray, 1987; Panksepp, 1992; Tellegen, in press; Zuckerman, 1983) and represented with subtle definitional variations in other models of personality as Extraversion (Costa & McCrae, 1985; Gough, 1987; Eysenck & Eysenck, 1975), Activity (Buss & Plomin, 1975), and Ambition/Sociability (Hogan, 1986).

NEM, on the other hand, is orthogonal to PEM and refers to dispositions toward negative mood and emotion and a tendency towards adversarial interactions with others. It is theoretically linked to functioning of the neurobiological system underlying defensive-withdrawal behavior (Gray, 1987; Panksepp, 1992; Tellegen, in press; Zuckerman, 1983) and is synonymous with Neuroticism (Costa & McCrae, 1985; Eysenck & Eysenck, 1975), Emotionality (Buss & Plomin, 1975), and (negative) Adjustment (Hogan, 1986). It is ubiquitous in the field of personality assessment and "has emerged in every model of personality based on questionnaire measurement" (Zuckerman, 1999; p. 68).

Many models of personality also posit the existence of a separate disinhibition-constraint dimension—referred to here as *CON*—that involves tendencies anchored by planfulness vs. spontaneity, restraint vs. recklessness, and harm-avoidance vs. risk-taking. CON is thought to reflect individual differences in functioning of the brain regulatory system that governs behavioral restraint, and it has been referred to by other theorists as psychoticism (Eysenck & Eysenck, 1975), novelty-seeking (Cloninger, 1987), impulsivity (Buss & Plomin, 1975), control (Gough, 1987), and prudence (Hogan, 1986).

Support for the validity of these higher-order personality dimensions and their relevance to the development of psychopathology comes from multiple sources. For example, there is evidence that these factors correspond closely to dimensions of temperament identified in studies on infancy and early childhood (Rothbart, Derryberry, & Posner, 1994). Behavior genetics studies have shown them to have substantial heritabilities (e.g., Robinson, Kagan, Reznick, & Corley, 1992; Tellegen et al., 1988), and scales measuring these constructs evidence long-term stability in adulthood (Costa & McCrae, 1977; Costa & McCrae, 1992; Watson & Walker, 1996).

In addition, a growing body of research on the interface between personality and psychopathology suggests that these dimensions relate differentially to the *externalizing* and *internalizing* categories of disorders—conceptualized as distinct classes of psychopathology that differ with regard to the form in which psychological distress is expressed (Krueger, McGue, & Iacono, 2001; Krueger, Caspi, Moffitt, & Silva, 1998). This taxonomy is derived from a long tradition of research in the area of childhood behavior disorders (e.g., Achenbach & Edelbrock, 1978, 1984) and is supported by recent factor-analytic studies of the latent structure of adult mental illness (Krueger et al., 2001, 1998; Cox, Clara, & Enns, 2002). Krueger and colleagues have shown that patterns of psychiatric comorbidity cohere along two orthogonal dimensions that they have labeled *internalization* (i.e., the propensity to express distress inwards) and *externalization* (the propensity to express distress outwards). The substance-related disorders and antisocial personality disorder (ASPD) load on the externalizing dimension; the unipolar mood and anxiety disorders fall on the internalizing dimension. These dimensions are believed to reflect core personality/temperament processes that influence the form and expression of psychopathology. Accumulating evidence suggests that high NEM reflects the personality substrate for the internalizing disorders, whereas low CON, particularly when combined with high NEM, represents the substrate for substance dependence and antisocial behavior (i.e., the externalizing disorders; Krueger et al., 2001; Schwartz, Snidman, & Kagan, 1996).

The review that follows provides an overview of research on the influence of the personality dimensions PEM, NEM, and CON on the development, course, and expression of PTSD. It will conclude: (a) that high NEM is the primary personality risk factor for the development of PTSD, and (b) that low CON and low PEM influence the expression of the disorder as well, particularly when either is combined with high NEM.[1] A model for the interface between personality and PTSD will be advanced that proposes that low PEM and low CON interact with high NEM to influence the form and expression of the posttraumatic response. Within this framework, a premorbid personality characterized by high NEM combined with low PEM is thought to predispose the trauma-exposed individual towards an *internalizing* form of posttraumatic response characterized by marked social avoidance, anxiety, and depression. On the other hand, a premorbid personality characterized by high NEM and low CON should predict an *externalizing* form of posttraumatic reaction characterized by marked impulsivity, aggression, and a propensity towards antisociality and substance abuse.

METHODOLOGICAL ISSUES IN THE STUDY OF PERSONALITY AND PTSD

A number of methodological issues unique to the study of the influence of personality on the development, course, and expression of PTSD present formidable obstacles to research in this area and are important to address as a context for appreciating this literature. Prospective longitudinal studies employing pre- and posttrauma assessments are the method of choice for addressing etiological questions because they permit examination of whether personality traits existed differentially between individuals with and without PTSD prior to trauma exposure. Unfortunately, obtaining an adequate sample of individuals who did not have PTSD at an initial assessment, but who developed the disorder by a second point in response to an interim event, necessitates a very large sample followed over an extended period of time, making this type of research expensive, time consuming, and rare. Because of this, some investigators have resorted to studying populations at high risk for trauma exposure (e.g., active duty military personnel; Bramsen, Dirkzwager, & Van der Ploeg, 2000), however, this approach introduces problems concerning the external generalizability of study findings to other populations.

Posttrauma prospective designs in which trauma-exposed individuals are assessed shortly after exposure and followed longitudinally to examine factors that affect the course of the posttraumatic response (e.g., who recovers versus who develops a chronic condition) are becoming more common. Recent studies have followed trauma-exposed individuals over periods ranging from months to years following motor vehicle accidents (e.g., Bryant, Harvey, Guthrie, & Moulds, 2000; Koren, Arnon, & Klein, 1999), sexual assaults (e.g., Zoellner, Foa, & Brigidi, 1999), and combat (Wolfe, Erickson, Sharkansky, King, & King, 1999). The advantage of this approach is that it may permit investigators to identify variables present immediately after the trauma that precede the onset of the disorder and/or that predict the course of the disorder. The drawback is that scores on personality measures administered posttrauma may be contaminated by transient correlates of the acute traumatic reaction (e.g., increased negative affect) and rendering it impossible to differentiate phasic adjustment reactions from long-standing traits that existed prior to the trauma.

The latter issue is the primary problem with cross-sectional research—by far the most common methodology in the field. Personality traits measured posttrauma may reflect either (a) enduring characteristics that were evident prior to the event, (b) correlates of transient stress-related symptomatology, (c) permanent alterations in personality that occur as a consequence of trauma exposure, or any combination thereof. Although there is substantial evidence for the longitudinal stability of personality (e.g., Costa & McCrae, 1977; Costa & McCrae, 1992; Watson & Walker, 1996), personality scales are also known to be susceptible to contamination by mental health state at the time of measurement (Bianchi & Fergusson, 1977; Duncan-Jones, Fergusson, Ormel, & Horwood, 1990; Ingham, Kreitman, McMiller, Sashidharan, & Surtees, 1986; Kerr, Schapira, Roth, & Garside, 1970) and patients with histories of anxiety and depressive disorders have been shown to respond differently to personality inventories during the experience of a disorder compared to after the remission of symptoms (Hirschfeld et al., 1983; Reich, Noyes, Coryell, & O'Gorman, 1986). As a result, it is impossible to draw etiological inferences from cross-sectional studies of personality traits measured posttrauma.

Finally, some studies have employed a modified posttrauma cross-sectional design in which retrospective reports of pretrauma characteristics are obtained. One example is the National Vietnam Veterans Readjustment Study (NVVRS; Kulka et al., 1990) which included measures of current symptomatology assessed a decade after the war in conjunction with retrospective reports of the war experience and prewar characteristics. This approach is limited, of course, by the accuracy of retrospective reports which are known to be adversely affected by the passage of time and mood-memory biases (Rogler, Malgady, & Tryon, 1992; Harvey & Bryant, 2000).

In sum, the methodological challenges associated with the study of the influence of personality on the development and course of PTSD are considerable. While pretrauma prospective longitudinal designs are clearly the methodology of choice from a scientific standpoint, these studies are rare and an exhaustive survey of the existing literature located only four that met criteria for inclusion in this review. In contrast, the much more common cross-sectional approach, which has been employed in the majority of published studies on the topic, introduces numerous problems of interpretation.

REVIEW OF RESEARCH ON PERSONALITY AND PTSD

Pretrauma Prospective Studies

Four prospective longitudinal studies, summarized in Table 1, have included assessments of personality traits prior to exposure to potentially traumatic events. All of them have shown significant associations between characteristics linked to NEM measured prior to trauma exposure and the subsequent development of PTSD. For example, in one study that featured a particularly large sample, O'Toole, Marshall, Schureck, and Dobson (1998a) examined the military records of 641 Vietnam veterans and found that those who developed combat-related PTSD scored significantly higher on a measure of neuroticism (e.g., the Self-Description Inventory; Miles, Wilkes, Lester, & Hutchins, 1946) administered at the time of enlistment than those who never developed the disorder. In a similar study, Bramsen et al. (2000) assessed 572 soldiers before and after deployment on a peacekeeping operation. Results showed that a pre-deployment measure of NEM (e.g., *negativism* or "a

Table 1. Pretrauma Prospective Studies of Personality and PTSD

Study	Sample	Personality Assessment	PTSD Assessment	Method	Findings
Bramsen, Dirkzwager, & van der Ploeg (2000). Predeployment personality traits and exposure to trauma as predictors of posttraumatic stress symptoms: A prospective study of former peacekeepers. *American Journal of Psychiatry, 157,* 1115–1119.	572 male military peacekeepers	Dutch version of the MMPI.	Self-Rating Inventory for PTSD.	Dutch MMPI administered prior to deployment on a peacekeeping mission; PTSD assessed less than 3 years later.	Pre-deployment Neuroticism and paranoia/psychotic ideation predicted post-deployment PTSD.
Lee, Vaillant, Torrey, & Elder (1995). A 50-year prospective study of the psychological sequelae of World War II combat. *American Journal of Psychiatry, 152,* 516–522.	150 male WWII veterans	Psychosomaticism Scale developed for this study.	DSM-III-referenced rating and self-report measures developed for this study.	Psychosomaticism assessed prior to military enlistment; PTSD assessed in 1946 and 1988.	Pre-war Psychosomaticism (NEM) predicted the development of PTSD in veterans exposed to low levels of combat intensity.
O'Toole, Marshall, Schureck, & Dobson (1998). Risk factors for posttraumatic stress disorder in Australian Vietnam veterans. *Australian and New Zealand Journal of Psychiatry, 32,* 21–31.	641 male Vietnam veterans	Self-description Inventory (highly correlated with Eysenck's neuroticism)	AUSCID-IV interview (derived from the SCID PTSD module).	Personality data drawn from enlistment records. PTSD assessed apx. 20 years after the war.	Participants with combat-related PTSD scored higher than participants without the disorder on a measure of neuroticism administered at the time of entry into the service.
Schnurr, Friedman, & Rosenberg (1993). Premilitary MMPI scores as predictors of combat-related PTSD symptoms. *American Journal of Psychiatry, 150, 479–483.*	131 male Vietnam and Vietnam-era veterans	MMPI	MISS and SCID	MMPIs administered prior to military enlistment. MISS and SCID collected apx. 20 years after the war.	Pre-war scores on MMPI Hypochondriasis and paranoia scales (high NEM) as well as psychopathic deviate (low CON) predicted those who went on to develop PTSD symptoms.

Note. MISS = Mississippi Scale for Combat-related PTSD (Keane, Caddell, & Taylor, 1988); MMPI = Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1967); SCID = Structured Clinical Interview for DSM (Spitzer, Williams, & Gibbon, 1987).

negative, dissatisfied, and hostile attitude toward others and life in general"; Bramsen et al., 2000, p. 1116) predicted scores on a self-report measure of PTSD symptomatology, even after statistically controlling for the severity of peacekeeping stressors, demographic variables, and other premorbid personality characteristics.

Low CON was implicated as a possible risk factor for the development of PTSD in two studies. O'Toole et al. (1998a) reported that veterans with diagnoses of combat-related PTSD were more likely to have had premilitary criminal records and symptoms of antisocial personality disorder at the time of military enlistment. Similarly, Schnurr, Friedman, and Rosenberg (1993) reported that Vietnam veterans who endorsed any lifetime PTSD symptoms produced higher scores on the MMPI Psychopathic Deviate scale (which is associated with low CON; Harkness, McNulty, & Ben-Porath, 1995) prior to enlistment compared to those with no PTSD symptoms.

These studies suffer collectively from several significant limitations. First, the fact that all of the samples were drawn from populations of male military personnel raises doubts about the generalizability of the findings to women and other trauma populations. Second, none of the studies included a comprehensive, multidimensional assessment of personality. Schnurr et al. (1993) and Bramsen et al. (2000) employed versions of the MMPI, but this test was designed primarily for the assessment of psychopathological syndromes rather than traits that comprise the structure of normal personality. Third, it is possible that a premilitary trauma history and/or premorbid anxiety or mood disorders may have accounted for observed associations between premorbid personality characteristics and the

subsequent development of PTSD symptoms. Unfortunately, these variables were not assessed prior to trauma exposure in any of these studies. Fourth, PTSD was treated by some investigators as a categorical diagnosis and by others as a dimensional score. The latter raises issues about the applicability of the findings to our understanding of the disorder as defined by the *DSM*. Nevertheless, despite these limitations, the pretrauma prospective studies reviewed here make a unique and important contribution to the literature on personality and PTSD because they are they only ones published to date that directly addressed the question of whether personality differences existed differentially prior to trauma in individuals who did versus did not develop PTSD.

Posttrauma Prospective Studies

The posttrauma prospective studies, summarized in Table 2, point to a possible role for not only high NEM and low CON, but also low PEM, in the development of PTSD. For example, Fauerbach, Lawrence, Schmidt, Munster, and Costa (2000) administered the NEO Personality Inventory (Costa & McCrae, 1985) to 70 burn patients at the time of hospital discharge and found that neuroticism *and* introversion predicted PTSD diagnoses 4 and 12 months later. Similarly, Carlier, Lamberts, and Gersons (1997) assessed the personality characteristics of police officers two weeks after they were exposed to traumatic events in the line of duty and followed them up 3 and 12 months later. Results showed that introversion, but in this case not neuroticism, measured two weeks after the trauma predicted the presence of PTSD symptoms 3 months later, even after controlling for trauma severity, emotional exhaustion during the trauma, social support, and emotional expressivity.

In another study of this type, Holeva and Tarrier (2001) reported that neuroticism and psychoticism (inversely related to CON) measured less than one month after a traumatic motor vehicle accident predicted PTSD caseness (i.e., scores above or below a diagnostic cut-off on a PTSD scale) four to six months later, even after controlling for the influence of an array of other relevant variables including previous accident history, accident severity, the presence of acute stress disorder, and peritraumatic dissociation. Likewise, Bennett, Owen, Koutsakis, and Bison (2002) found that the Negative Affect scale of the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) administered to patients hospitalized for myocardial infarction predicted the severity of PTSD symptoms related to the heart attack three months later. Finally, McFarlane (1992) found that neuroticism predicted the progression of the syndrome from intrusive symptoms in the acute aftermath of trauma to chronic disorder over three years later.

This collection of studies features two noteworthy methodological improvements compared to the pretrauma prospective studies. First, whereas the later examined male combat veterans exclusively, these studies drew from a variety of trauma populations, most of which included women. Second, all of the posttrauma prospective studies featured personality assessments based on the administration of multidimensional inventories. Compared to the assessment of single traits in isolation, this permits a more comprehensive and discriminative analysis of personality dimensions that do, and do not, relate to the development of PTSD. Another feature of these studies is that the initial assessments took place within approximately one month of the time of trauma. This reflects an expectation that self-descriptions on measures administered proximate to the time of trauma will more closely resemble premorbid personality than measures administered months or years following the onset of the clinical syndrome. Unfortunately, no prospective study of PTSD has directly examined this question by evaluating the degree to which measures of personality traits are contaminated by posttraumatic symptomatology or by assessing whether it is possible to obtain a measure of personality that is uncontaminated by the posttraumatic reaction by administering the instrument shortly after trauma exposure.

Cross-Sectional Studies of Personality and PTSD

Studies Suggesting an Association Between High NEM, Low PEM, and PTSD. Results of cross-sectional studies of personality and PTSD are generally consistent with the findings of longitudinal studies in that many have found that individuals with PTSD produce high and low scores on scales measuring NEM and PEM, respectively. For example, Breslau et al. (1991) reported that in a large

Table 2. Posttrauma prospective studies of personality and PTSD

Study	Sample	Personality Assessment	PTSD Assessment	Method	Personality-PTSD Findings
Bennett, Owen, Koutsakis, & Bisson (2002). Personality, social context and cognitive predictors of post-traumatic stress disorder in myocardial infarction patients. *Psychology and Health, 17,* 489–500.	89 male and female patients with recent myocardial infarction	PANAS-NA (trait)	PDS	NA measured in hospital; PDS completed 3 months later.	Trait NA at time 1 predicted PTSD symptom severity at time 2.
Carlier, Lamberts, & Gersons (1997). Risk factors for posttraumatic stress symptomatology in police officers: A prospective analysis. *Journal of Nervous and Mental Disease, 185,* 498–506.	262 male and female police officers	Sensation-seeking Neuroticism and Extraversion	SI-PTSD	Participants assessed 2 weeks, 3 months, and 12 months following traumatic events experienced on the job.	Introversion measured 2 weeks post-trauma was a significant predictor of the presence of PTSD symptom severity at 3 months.
Fauerbach, Lawrence, Schmidt, Munster, and Costa (2000). Personality predictors of injury-related posttraumatic stress disorder. *Journal of Nervous and Mental Disease, 188,* 510–517.	70 male and female burn survivors	NEO-FFI	SCID	Participants completed the NEO at hospital discharge. PTSD assessed at discharge, and 4 and 12 months later.	Neuroticism and introversion at time 1 predicted subsequent PTSD diagnosis.
Holeva & Tarrier (2001). Personality and peritraumatic dissociation in the prediction of PTSD in victims of road traffic accidents. *J Psychosomatic Research, 51,* 687–692.	265 male and female MVA survivors	EPQ	Penn Inventory	EPQ was administered 2–4 weeks after the accident and PTSD was assessed 4–6 months after.	Neuroticism and psychoticism at time 1 predicted PTSD symptom severity at time 2.
McFarlane (1992). Avoidance and intrusion in Posttraumatic Stress Disorder. *Journal of Nervous and Mental Disease, 180,* 439–445.	290 male firefighters	EPQ	DIS	EPQ was completed 29 months after the fire and the DIS was administered 13 months later.	Neuroticism at time 1 predicted PTSD diagnosis at time 2.
Nightingale & Williams (2000). Attitudes to emotional expression and personality in predicting post-traumatic stress disorder. *British Journal of Clinical Psychology, 39,* 243–254.	39 male and female MVA survivors	NEO-FFI	Self-report inventory.	Participants were assessed 1 and 6 weeks after the MVA.	Although analyses did not directly address the relationship between the NEO and PTSD, openness, extraversion, and agreeableness was shown to be associated with attitudes towards emotional expression which, in turn, predicted PTSD symptom severity at time 2.
Roca, Spence, & Munster (1992). Posttraumatic adaptation and distress among adult burn survivors. *American Journal of Psychiatry, 149,* 1234–1238.	29 male and female burn survivors	NEO-FFI	SCID	NEO was administered near the time of hospital discharge; SCID administered 4 months later.	Individuals who endorsed re-experiencing symptoms at follow-up had lower openness scores at discharge.

Note. DIS = Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981); EPQ = Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975); MVA = Motor Vehicle Accident; NEO-FFI = NEO Five Factor Inventory (Costa & McCrae, 1992); PANAS = Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988); PDS = Posttraumatic Diagnostic Scale (Foa, Cashman, Jaycox, & Perry, 1997); SCID = Structured Clinical Interview for DSM (Spitzer, R.L., Williams, J.B., Gibbon, M. 1987); SI-PTSD = Structured Interview for PTSD (Davidson, Smith, & Kudler, 1989).

sample of individuals exposed to trauma (n = 394), neuroticism was a significant predictor of a lifetime diagnosis of PTSD even after controlling for the effects of sex, early parental separation, preexisting anxiety/depression, family history of anxiety, and a family history of antisocial behavior. Evidence for an association between high NEM and concurrent PTSD symptoms has also been observed in a variety of samples including

emergency services personnel (Weiss, Marmar, Metzler, & Ronfeldt, 1995; McFarlane, 1989; Regehr, Hill, & Glancy, 2000), child survivors of a hurricane (Lonigan, Shannon, Taylor, Finch, & Sallee, 1994), trauma-exposed college students (Lauterbach & Vrana, 2001), and combat veterans (e.g., Casella & Motta, 1990; Hyer et al., 1994; Talbert, Braswell, Albrecht, Hyer, & Boudewyns, 1993). Similarly, low scores on measures of PEM have been found in combat veterans (Davidson, Kudler, & Smith, 1987; Hyer et al., 1988; Kuhne, Orr, & Baraga, 1993; Richman & Fruch, 1997; Dalton, Aubuchon, Tom, Pederson, & McFarland, 1993) and emergency services personnel with PTSD (McFarlane, 1988a, 1988b).

Hardiness and PTSD. A subset of the posttrauma cross-sectional studies of personality and PTSD have focused on the personality construct *hardiness* (Kobasa, 1979). Hardiness is conceptualized as a constellation of personality characteristics that function as a resilience resource during encounters with stressful life events and it relates to how individuals perceive and cope with such events. It is thought to reflect a combination of adaptive temperament traits complemented by an early learning history characterized by rich, rewarding, and varied experiences. Hardiness has three facets: *commitment*, the sense of meaning, purpose, and perseverance attributed to one's existence; *control*, one's sense of autonomy and perceived ability to influence one's destiny and manage experiences; and *challenge*, one's tendency to perceive change as an exciting opportunity for growth. Hardy individuals tend to view potentially stressful situations as meaningful and interesting (commitment), appraise stressors as changeable (control), and see change as a normal aspect of life and an opportunity for growth, rather than as a threat (challenge). Research suggests that hardiness plays a role in moderating the impact of stress on physical health, mental health, and other indices of stress adaptation. It has been shown to predict (a) the physical health of men (Kobasa, Maddi, & Courington, 1981) and women (Lawler & Schmied, 1992) over a five-year period of time, (b) the mental health, performance, and probability of graduating from stressful military training programs (Florian, Milkulincer, & Taubman, 1995; Westman, 1990), and (c) the mental health of disaster assistance workers (Bartone, Ursano, Wright, & Ingraham, 1989).

Several cross-sectional studies have found relationships between hardiness and PTSD symptoms in trauma-exposed individuals. For example, Bartone (1999) assessed hardiness, combat exposure, and PTSD symptoms in Gulf War veterans shortly after the war. Using multiple regression analyses to predict PTSD severity, a main effect of hardiness and a hardiness × combat exposure interaction was found, indicating that high-hardy veterans were less symptomatic than low-hardy veterans overall and that this difference was more pronounced for individuals reporting the highest levels of combat exposure. Similarly, Sutker, Davis, Uddo, and Ditta (1995) assessed Gulf War veterans within one year of homecoming and found that hardiness, particularly the commitment subscale (i.e., the sense of meaning, purpose, and perseverance associated with one's work), differentiated cases with and without diagnoses of PTSD. Of note, this finding is consistent with Hendin & Haas' (1984) observation that a common characteristic of Vietnam combat veterans who never developed PTSD was that they were able to find purpose in their duties during the war, even when assignments appeared to be pointless, lacking structure, or highly chaotic.

Finally, in a pair of studies that used structural equation modeling to examine the relative influences of hardiness, prewar risk factors, war-zone stressors, postwar life stressors, and other postwar recovery and resilience factors on the development of PTSD, King, King, and colleagues analyzed data from 1,632 veterans collected for the National Vietnam Veterans Readjustment Study (NVVRS; Kulka et al., 1990). In both studies, hardiness was indexed by an 11-item scale constructed from NVVRS interview items. In the first one (King, King, Fairbank, Keane, & Adams, 1998), the structural equation model revealed evidence of a direct negative association between hardiness and PTSD symptom severity as well as an indirect effect of hardiness on PTSD mediated by social support. In other words, hardy individuals were found to have less severe PTSD and to be more likely to utilize support from others effectively, which, in itself, was associated with lower PTSD severity. Similar results were observed in a second study using a different combination of predictor variables (King et al., 1999).

Criticism of the Hardiness Construct: Hardiness = low NEM/high PEM. Research on hardiness has been criticized on the grounds that insufficient attention has been paid to how the construct relates to traits identified in omnibus models of personality, and some investigators have argued that hardiness merely represents the inverse of NEM (Funk, 1992; Rhodewalt & Zone, 1989; Funk & Houston, 1987) or a combination of low NEM and high PEM (Parkes & Rendall, 1988). Evidence for the latter comes from several sources. Parkes and Rendall found that hardiness was positively correlated with extraversion and negatively correlated with neuroticism. Similarly, Ramanaiah, Sharpe, and Byravan (1999) found that high-hardy undergraduates scored significantly lower than their less hardy counterparts on neuroticism and higher on the extraversion, openness, and conscientiousness scales of the NEO (Costa & McCrae, 1992). Other work has shown that the relationships between hardiness and health outcomes disappear when measures of NEM are partialed out (Funk & Houston, 1987; Rhodewalt & Zone, 1989). In sum, individuals who obtain low scores on hardiness scales tend to feel alienated from self and others, powerless, and in need of security. These characteristics are strongly associated with NEM and general measures of maladjustment, and are synonymous with many forms of psychopathology, including PTSD.

Research Suggesting an Association Between High NEM/Low CON and PTSD. Another body of cross-sectional research suggests that low CON (i.e., impulsivity) represents a risk factor for the development of PTSD and may at least partially account for the high rates of comorbidity observed between PTSD, antisocial personality disorder, and substance-related disorders, especially in males. Evidence for this association comes from several sources. First, studies have shown that individuals with PTSD score lower than controls on measures of CON (Kuhne et al., 1993) and higher on associated constructs such as sensation-seeking (Wilson, Smith, & Johnson, 1985) and novelty-seeking (Wang, Mason, Charney, & Yehuda, 1997; Richman & Fruch, 1997). Second, there is considerable evidence that individuals with a history of childhood antisocial behavior or conduct disorder—often conceptualized as a behavioral reflection of low CON (e.g., Krueger, Caspi, Moffitt, Silva, & McGee, 1996)—have a greater likelihood of developing PTSD independent of trauma exposure. For example, in one epidemiologic study of 2,493 adults, Helzer et al. (1987) found that among participants reporting high levels of antisocial behavior prior to age 15, 29% reported symptoms of PTSD, and 6% met the full DSM-III diagnostic criteria for the disorder. In contrast, only 14% of individuals with low levels of childhood antisociality reported any PTSD symptoms and 1% met full criteria for the disorder. Similarly, in a nationally representative sample of 5,877 individuals aged 15 to 54 years, Kessler et al. (1995) found that 43% of individuals with a lifetime diagnosis of PTSD (compared to 19% with no history of PTSD) had a history of childhood conduct disorder.

There is also evidence of high rates of comorbidity between PTSD and adult ASPD, at least in males. For example, Kulka et al. (1990), found that 30% of veterans with a current diagnosis of PTSD met lifetime criteria for ASPD compared to 6% of those without the disorder. Similar rates of comorbid ASPD have been observed in other samples of male veterans with PTSD (Sierles, Chen, Messing, Besyner, & Taylor, 1986; Sierles, Chen, McFarland, & Taylor, 1983; O'Toole, Marshall, Schureck, & Dobson, 1998b) and a sample of incarcerated men (Gibson et al., 1999).[2]

For females, however, there is relatively little support for this link. King et al. (1996) used structural equation modeling to examine relationships among prewar factors, measures of war-zone stress, and current PTSD symptomatology using data from 432 female and 1,200 male veterans in the National Vietnam Veterans Readjustment Study (Kulka et al., 1990). Analyses revealed that childhood antisocial behavior (e.g., excessive fighting, substance abuse, legal difficulties) had a significant indirect effect on PTSD symptom severity that was moderated by age and war-zone stressors in males, but not females. Although the authors noted that the absence of an effect for women may have reflected problems with the measurement of antisociality in females, or unusually low base rates of such behavior among women in the NVVRS sample (mostly nurses), other studies have found no significant differences in rates of ASPD between women with and without PTSD as well (e.g., Zlotnick, 1997; Zlotnick, Zimmerman, Wolfsdorf, & Mattia, 2001).

Research on the emotional and temperamental correlates of antisocial behavior may inform our understanding of the relationship between low CON and PTSD. As noted earlier, antisociality has often been conceptualized as a syndrome of disinhibition/poor constraint (Gorenstein & Newman, 1980; Sher & Trull, 1994; Widiger & Clark, 2000). Supporting this hypothesis is considerable evidence for an association between measures of antisocial behavior and low CON (for a review, see Patrick & Zempolich, 1998). The relationship between antisociality and NEM, however, is less straightforward. On the one hand, primary psychopathy, defined by low CON, an "absence of nervousness or other neurotic manifestations," and high scores on the emotional detachment factor of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991) is associated with low scores on measures of NEM (Levenson, Kiehl, & Fitzpatrick, 1995; Patrick, 1994, 1995). On the other hand, secondary psychopathy, characterized by aggressive, impulsive, and undersocialized behavior and high scores on the antisocial behavior factor of the PCL-R, tends to be associated with high NEM (Levenson et al., 1995; Patrick, 1994; 1995). Given that antisociality in the PTSD studies reviewed above was defined primarily in terms of illegal actions and substance-related problems it can be assumed that the construct assessed in these studies was most highly related to secondary psychopathy and the antisocial behavior factor of the a PCL-R (i.e., factor 2). A growing body of literature suggests that high NEM combined with low CON is associated with increased risk for a range of pathological behaviors other than PTSD including alcoholism (McGue, Slutske, Taylor, & Iacono, 1997), delinquency (Krueger et al., 1994), suicide (Verona, Patrick, & Joiner, 2001), personality disorders (O'Boyle & Barratt, 1993), and aggressive reactions under conditions of increasing stress (Verona, Patrick, & Lang, 2002). Thus, it will be important in future research to address directly the hypothesis that this combination of traits also represents a vulnerability to the development of PTSD following trauma exposure.[3]

SUMMARY AND CONCLUSIONS

The objective of this review was to provide an overview of research on the influence of personality on the development, course, and expression of PTSD. Studies were selected for review if they measured constructs related to three higher-order dimensions of personality (PEM, NEM, and CON) that have been shown to be important to our understanding of broad classes of psychopathology (e.g., Krueger et al., 1998; 2001). Research in this area supports the conclusion that high NEM is a significant risk factor for both the onset and protracted course of PTSD following trauma exposure. Prospective studies have repeatedly shown this personality dimension to predict the development and course of PTSD, and dozens of cross-sectional studies have found associations between PTSD and measures of NEM when measured concurrently.

A wider body of research suggests that high NEM may be best conceptualized as a non-specific predictor of a broad class of psychopathology encompassing the anxiety and unipolar mood disorders referred to variously as the "internalizing disorders" (Krueger et al., 1996; 2001,) or "distress disorders" (Clark, Watson, & Mineka, 1994; Clark & Watson, 1991; Watson & Clark, 1984), as opposed to a specific risk factor for PTSD. In other words, NEM appears to represent a "generalized biological vulnerability" to anxiety and its disorders, including PTSD (Barlow, 2002). This assertion is based on evidence from multiple sources. First, epidemiological and twin-based studies have shown that covariation between anxiety and depressive symptoms and disorders is due largely to a common genetic factor that also influences NEM (Mineka, Watson, and Clark, 1998). Second, individuals with and without diagnoses of anxiety and/or major depression are differentiable on this dimension (Trull & Sher, 1994; Watson, Clark, & Carey, 1988; Widiger & Trull, 1992). Third, longitudinal studies have shown NEM to be a predictor of the onset of major depression (e.g., Hirschfeld et al., 1989) and panic attacks (Hayward, Killen, Kraemer, & Taylor, 2000). Fourth, research on the latent structure of *DSM*-defined depression and anxiety-related disorders suggests that NEM is a higher-order factor that accounts for covariation among these disorders (Spence, 1997; Zinbarg & Barlow, 1996) and that PTSD loads on a dimension of psychopathology defined by generalized anxiety disorder, major depressive episode, and dysthymia (Cox et al., 2002). Theorists have also noted a continuity between

NEM as a personality trait and the core clinical manifestations of anxiety disorders (i.e., excessive worry, avoidance, autonomic arousal), leading some to argue that only *quantitative* differences distinguish between the two (Barlow, 2002; Hirschfeld & Klerman, 1979; Eysenck, 1970).

The foregoing suggests that the high degree of symptom overlap between PTSD, major depression, and other anxiety disorders, as well as the high rates of comorbidity observed among these disorders (e.g., Breslau et al., 1991; Davidson et al., 1991; Kulka et al., 1990), reflects the influence of this underlying personality axis. Furthermore, if the continuity hypothesis advanced for the association between NEM and other anxiety disorders is true for PTSD (i.e., that PTSD, like the other anxiety disorders, is an extreme manifestation of normal personality processes), then one might hypothesize that *trauma exposure serves to accentuate pathogenic traits present in the pretrauma personality*. In other words, from this standpoint, NEM could be conceptualized as (a) a risk factor for the development of PTSD following trauma exposure, and (b) a dimension of personality that is altered as a consequence of trauma exposure.

This proposition is consistent with results of a recent taxometric investigation of the latent structure of PTSD which found evidence that PTSD is a dimensional disorder reflecting the upper end of a stress-response continuum, rather than a discrete clinical syndrome (Ruscio, Ruscio, & Keane, 2002). It is also supported by the results of cross-sectional studies, reviewed above, showing that the personality profiles of individuals with PTSD deviate from community norms or control groups in psychopathological directions, and data suggesting that scores on personality measures covary with the onset and remission of other Axis I conditions (Hirschfeld et al., 1989; Reich et al., 1986). It also echoes Clark et al.'s (1994) assertion that "repeated exposure to trauma eventually may raise one's level of trait NEM" (p. 110). This is not to suggest, however, that PTSD is equivalent to, or synonymous with, the extreme manifestation NEM, for the diagnostic criteria for PTSD clearly include a number of specific symptoms that are not subsumed within these constructs (e.g., hyperreactivity to trauma-specific stimuli and avoidance of such stimuli). Nonetheless, many of the characteristics evident in individuals with PTSD can be conceptualized from a dimensional perspective and are essentially synonymous with NEM (e.g., high NEM and PTSD both involve tendencies to feel nervous, tense, sensitive, vulnerable, betrayed, mistreated, unlucky, etc.).

The proposition that trauma exposure serves to accentuate pathogenic traits present in the *pre*trauma personality is also consistent with the observations of clinical theorists who have suggested that trauma can exert severe and protracted negative effects on a broad range of basic personality functions (e.g., Herman, 1992; Shay, 1994) and the World Health Organization's recognition of a category of disorders associated with "Enduring personality change after catastrophic experience" in the *ICD-10 Classification of Mental and Behavioral Disorders* (WHO, 1992). It is compatible with dimensional models of personality disorders positing that a common trait structure encompasses both the adaptive and maladaptive variants of personality and that personality disorders reflect extreme or excessive loadings on the basic traits (Clark, 1993; Costa & Widiger, 1994). It is also in line with evidence of a high prevalence of trauma in the histories of individuals with personality disorders (e.g., Barrett et al., 1996; Ellason, Ross, Sainton, & Mayaran, 1996; Herman, Perry, & Van der Kolk, 1989; Luntz & Widom, 1994; Ogata et al., 1990), and studies showing high rates of co-morbidity between PTSD and personality disorders (e.g., Bollinger, Riggs, Blake, & Ruzek, 2000; Faustman & White, 1989; Southwick, Yehuda, & Giller, 1993).

THE ROLE OF LOW PEM AND LOW CON IN A PERSONALITY-BASED TAXONOMY OF POSTTRAUMATIC RESPONSE

This review also found considerable evidence suggesting that low PEM and low CON may influence the expression of PTSD, particularly when these traits are combined with high NEM. One model for the influence of these dimensions on the response to trauma suggested by this review is that NEM represents the primary personality *risk factor* for PTSD which confers a direct vulnerability to the development of the disorder following trauma exposure, while low PEM and low CON serve as *moderating factors* that influence the form and expression of the posttraumatic response. In other words, PEM and CON are personality dimensions that

combine with NEM to produce qualitatively distinct forms of posttraumatic adaptation. From this standpoint, individuals characterized prior to trauma by high NEM combined with low PEM would be predisposed towards a form posttraumatic response characterized by marked anhedonia and depressive symptomatology, in addition to anxiety symptoms that are believed to be a more direct reflection of NEM. Moreover, given evidence for the covariation of NEM, the Axis I anxiety and depressive disorders, and the Cluster C subgroup of personality disorders characterized in *DSM-IV* as "anxious-fearful" (Sanderson, Wetzler, Beck, & Betz, 1994; Sanderson, Wetzler, Beck, & Betz, 1992; Zuckerman, 1999), these individuals might also be expected to have higher rates of avoidant, dependent, or obsessive-compulsive personality disorder diagnoses. Drawing from the taxonomy advanced by Krueger et al. (1996; 2001), this could be labeled as an *internalizing* form of posttraumatic response. In contrast, premorbid high NEM combined with low CON would be expected to predict an *externalizing* form of posttraumatic response characterized by tendencies towards impulsivity, aggression, antisociality, substance-related disorders, and higher rates of Cluster B personality disorders (i.e., the "dramatic-emotional" disorders—antisocial, borderline, histrionic, narcissistic—characterized by impulsive/sensation seeking behavior combined with labile emotionality).

Preliminary evidence in support of this taxonomy was found by Miller, Greif, and Smith (2003) who performed cluster analyses on Multidimensional Personality Questionnaire (MPQ; Tellegen, in press; Tellegen & Waller, in press) profiles obtained from 237 trauma-exposed combat veterans. Analyses revealed subgroups differing in tendencies toward the externalization versus internalization of posttraumatic distress. "Externalizers" and "internalizers" produced comparable scores on the MPQ Stress Reaction scale (a direct marker of NEM) but differed on traits relating to the form in which that distress is expressed. Specifically, the "externalizing" cluster was defined by low scores on measures of CON, along with elevated scores on scales measuring alienation and aggression. Individuals in this cluster were most likely to have a substance-related disorder diagnosis, to produce elevated scores on the MMPI-2 hypomania scale, and to have a history of delinquency prior to joining the military. In contrast, the MPQ profile of the "Internalizing" cluster was characterized by low scores on measures of PEM, and compared to the externalizers, higher CON and lower alienation and aggression. Veterans in this cluster had higher rates of unipolar depressive disorder diagnoses and their MMPI-2 profiles were characterized by elevations on scales measuring depression and introversion.

FUTURE DIRECTIONS

Research in the field of PTSD has historically emphasized the universality of the response to trauma by demonstrating commonalities in posttraumatic reactions across trauma populations (Acierno, Kilpatrick, & Resnick, 1999), developmental periods (Saigh, Yasik, Sack, & Koplewicz, 1999), and cultures (Marsella, Friedman, & Spain, 1996). Considerably less attention has been paid to the issue of the heterogeneity of posttraumatic responses, including patterns of comorbidity. A guiding hypothesis for future research suggested by this review is that premorbid personality characteristics influence the form and expression of posttraumatic response with high NEM/low CON tending to predict an externalizing reaction and high NEM/low PEM an internalizing one. In future studies it will be important to (a) examine the possible presence of personality-based subtypes of posttraumatic response in a variety of trauma populations, (b) clarify and elaborate upon the clinical and behavioral correlates of the hypothesized subtypes, (c) evaluate the strength of the association between personality traits measured pre- and posttrauma, and (d) explore the mechanisms by which these characteristics confer greater vulnerability to the development of the disorder.

It will also be important in such work to examine hypothetical alternatives to the proposition that trauma accentuates pathogenic traits present in the pretrauma personality (i.e., that trauma produces a pathological shift in basic behavioral dispositions and that the nature of this effect is determined by pretrauma characteristics). One possibility is that trauma exerts no influence on personality and that scores on measures of posttrauma personality simply reflect the premorbid capacities of the individual. A second is that trauma alters personality but this alteration is unrelated to preexisting vulnerabilities. These alternative conceptualizations of the

personality-trauma interface are best tested using pretrauma prospective designs. However, behavioral genetics studies can also shed light on these questions by examining the degree of similarity among identical twins discordant for trauma exposure on measures of personality and psychiatric symptomatology (e.g., in the Vietnam Era Twin Registry; Eisen, True, Goldberg, Henderson, & Robinette, 1987). Finally, research on personality-based subtypes of PTSD holds promise for the development of assessment and treatment techniques that more appropriately address individual differences in clinical presentation among trauma survivors. The model proposed here could be useful for guiding research on treatment matching and advancing theoretical conceptualizations of the person-trauma interaction.

NOTES

1. A fundamental assumption of this review is that the personality characteristics under consideration are bipolar and dimensional in nature, rather than qualitative (i.e., all or none). References to high NEM, low CON, or low PEM are intended to indicate the direction of the relationship between the personality trait and PTSD, not to imply that these characteristics necessarily represent a discrete class, or taxon, of vulnerability to PTSD.

2. There are two studies that have found no evidence of elevated rates of comorbid ASPD in PTSD samples (Bollinger, Riggs, Blake, & Ruzek, 2000; Orsillo et al., 1996). However, both reported unusually low rates of ASPD relative to other veteran samples (e.g., Kulka et al., 1990; Sierles, Chen, Messing, Besyner, & Taylor, 1986; Sierles, Chen, McFarland, & Taylor, 1983), suggesting that differences in the definition or assessment of ASPD may have contributed to these null results.

3. Although not a focus of this review, it is worth noting that there is also extensive evidence that low CON is associated with an increased likelihood of *exposure* to potentially traumatic events. Helzer et al. (1987), for example, found that individuals with a history of delinquency were more likely to have been beaten or mugged during the 18 months prior to their survey and more likely to have seen combat if they served in Vietnam than those who reported little or no history of delinquency. Childhood antisociality has also been shown to predict the intensity of combat experiences encountered by male Vietnam veterans (King et al., 1996; Koenen et al., 2002; O'Toole et al., 1998b), and Lauterbach and Vrana (2001) showed that the Gough Socialization Scale (an index of antisocial tendencies; Gough & Peterson, 1952) predicts exposure to potentially traumatic events in college students. Finally, research on the precursors of spinal cord injury suggests that individuals who suffer such traumas as a result of their own imprudent actions are more likely to produce low scores on scales assessing CON and associated constructs than those who suffer their injuries as the results of an accident that was unrelated to their own behavior (Fordyce, 1964; Kunce & Worley, 1966).

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